Jet Reconstruction Efficiencies

Fixed

13OCT04

UIC
James Heinmiller

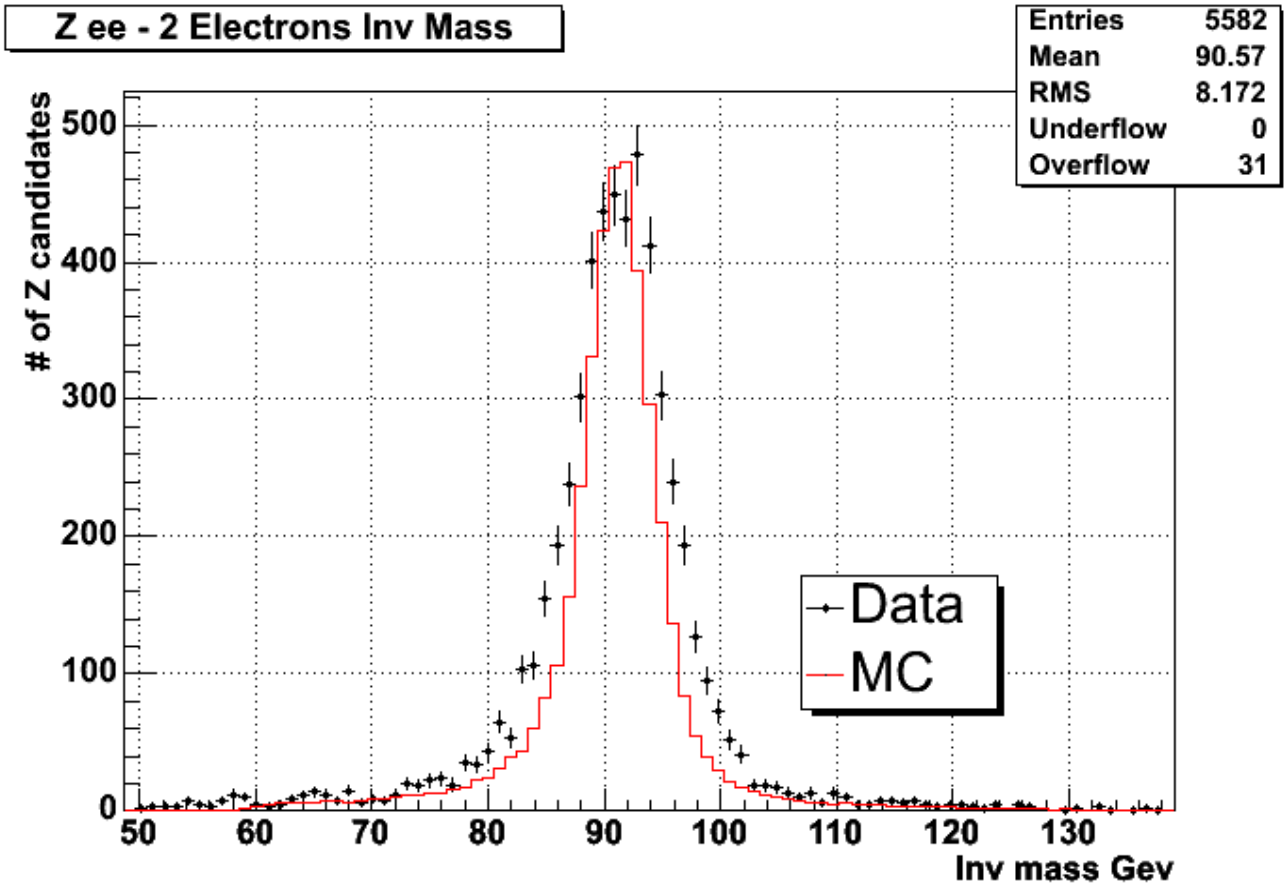
What has changed?

Investigated the “missing jets” at 20 GeV and 50 GeV
Cleaned up background contributions
Tried MET cut
Now using two track matches with opposite signs for the electrons
More data – up to trigger list V13
25GeV cut on the electrons (20GeV before)
Have included a 15GeV cut on the jets

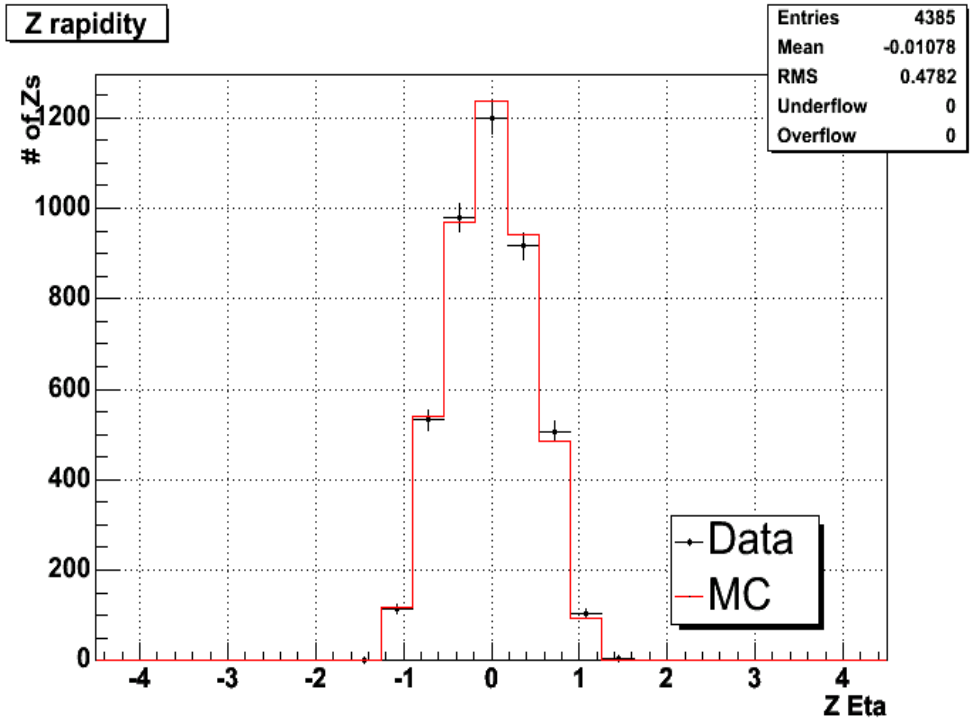
Outline

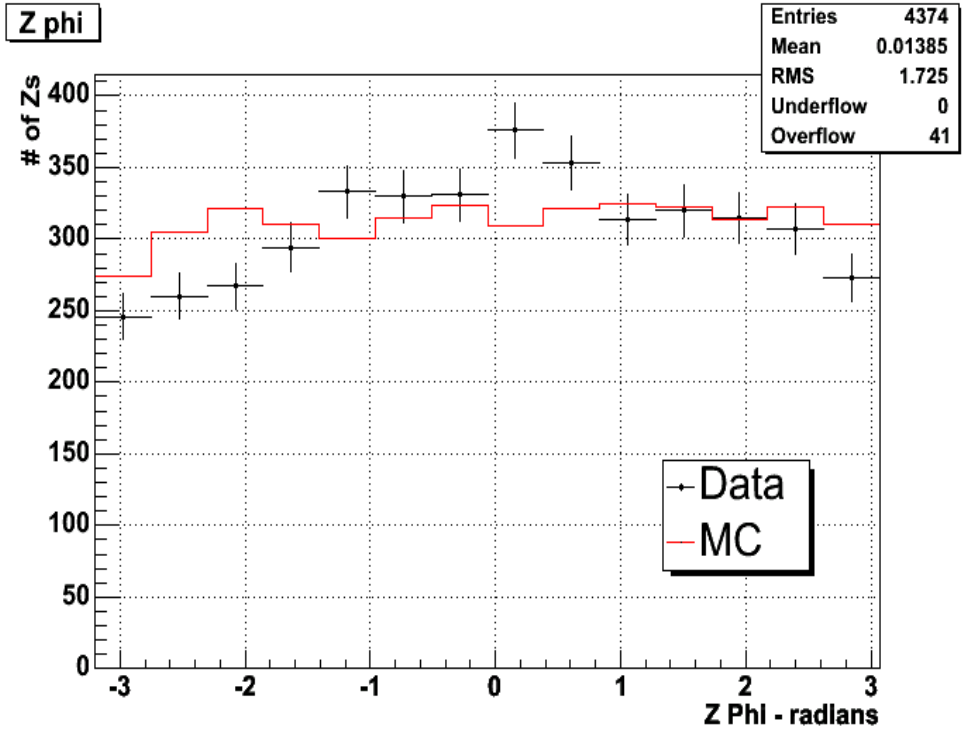
Z shape and distributions
Electron distributions
Jet distributions
Scale Factors
Straight Efficiencies

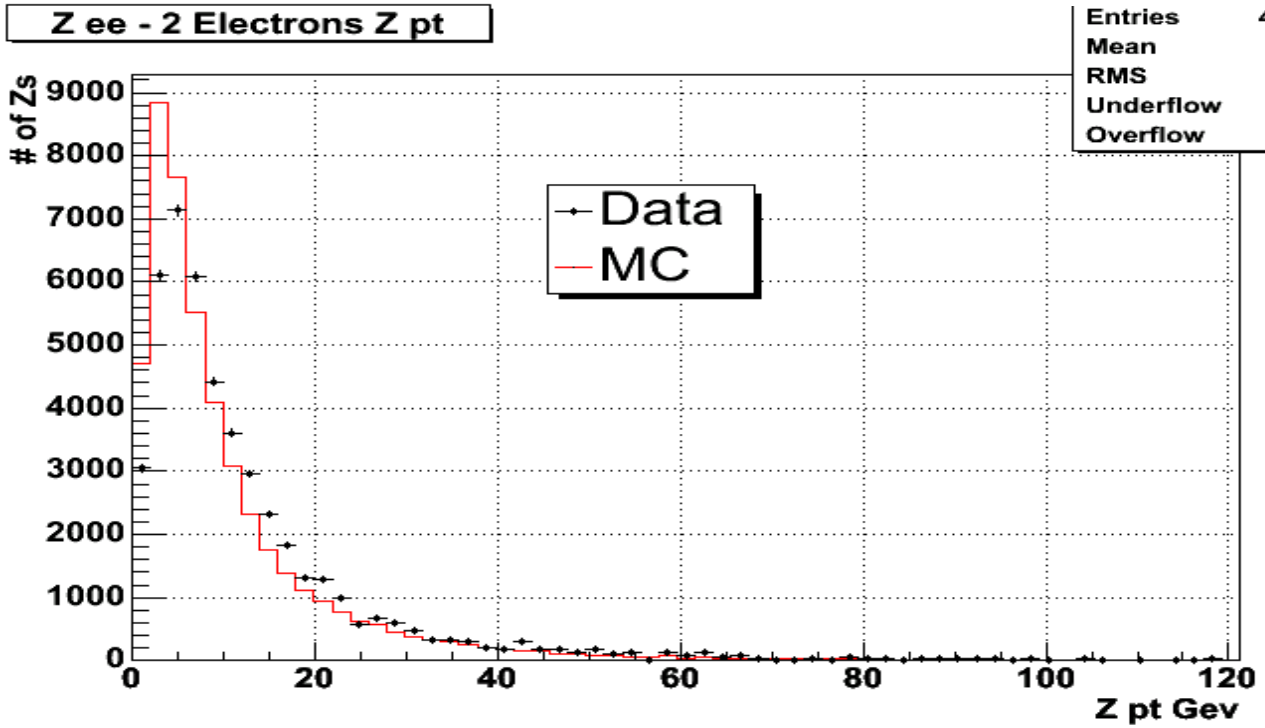
Z inv mass


Z ee - 2 Electrons Inv Mass
Entries 5582
Mean 90.57
RMS 8.172
Underflow 0
Overflow 31
# of Z candidates
0
100
200
300
400
500
50
60
70
80
90
100
110
120
130
Inv mass Gev
Data
MC

Z distributions







Electron Distributions

Track matched – opposite sign – same vertex

pt > 25.0 GeV

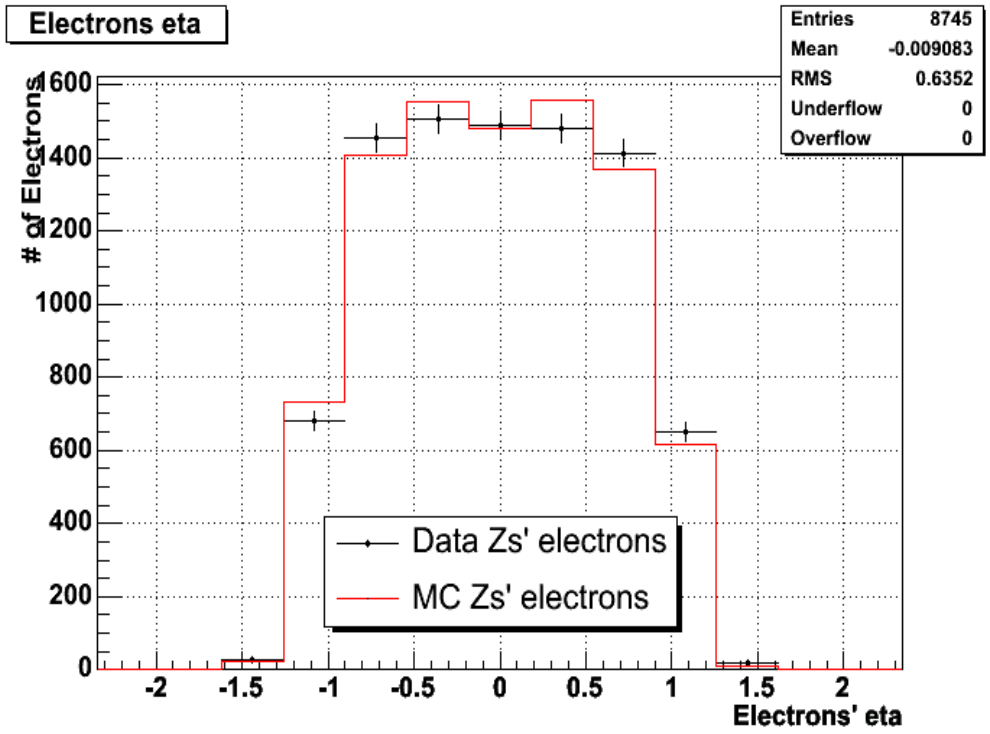
emf > 0.90

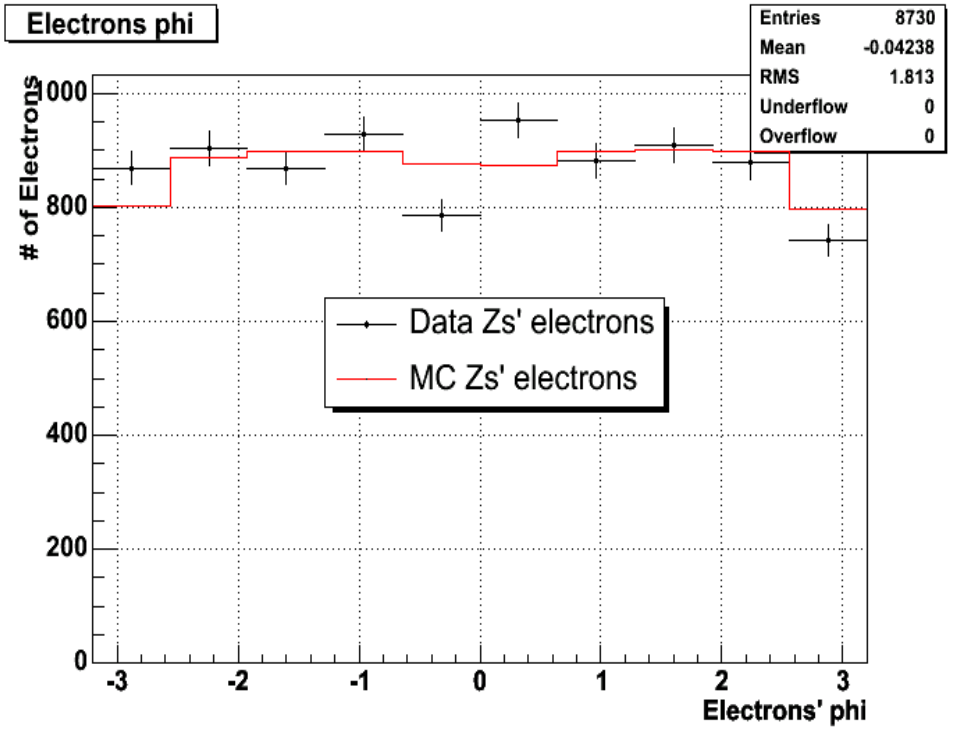
iso < 0.15

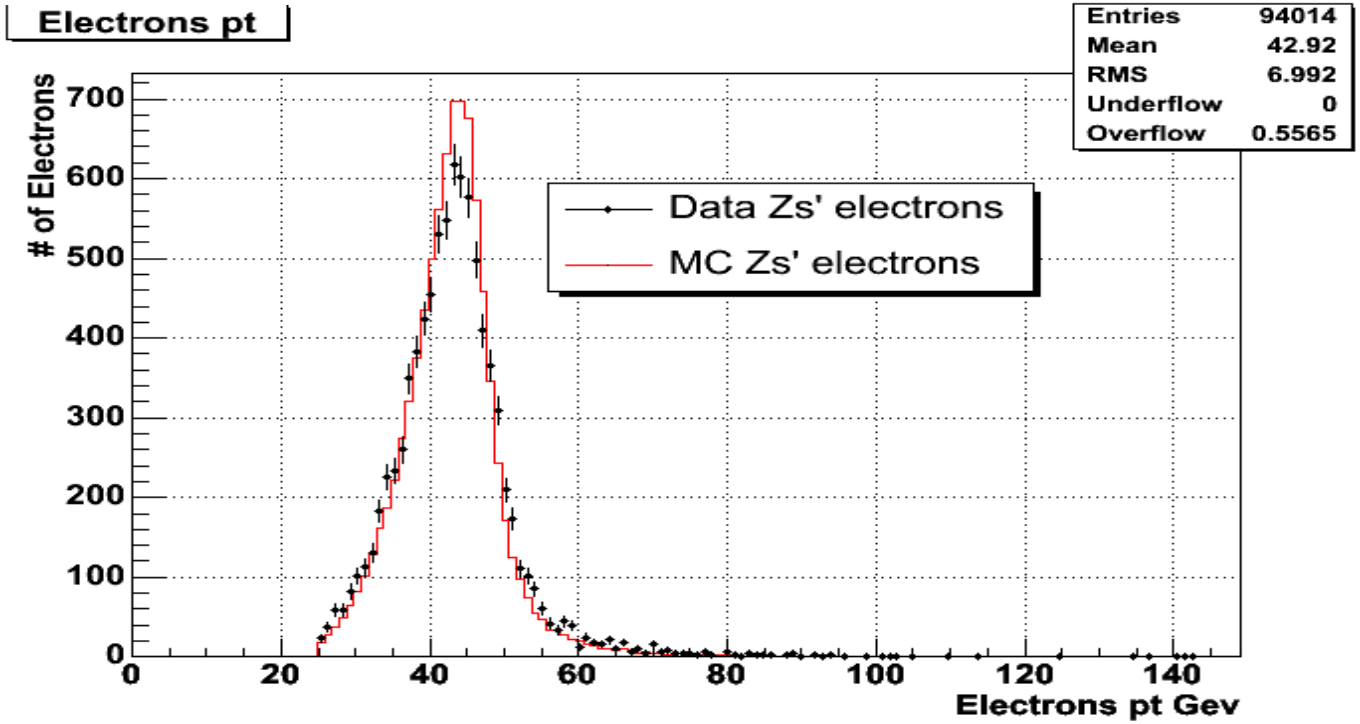
Hmatrix7 < 0.12

Inv Mass 80 to 100 GeV

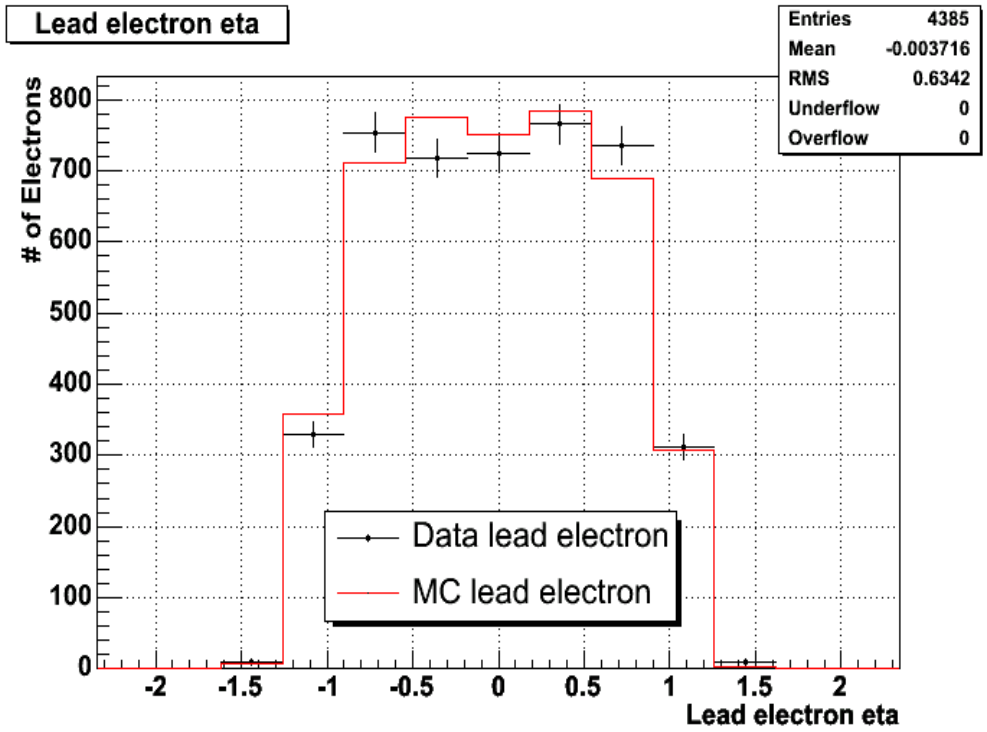
All electrons distributions

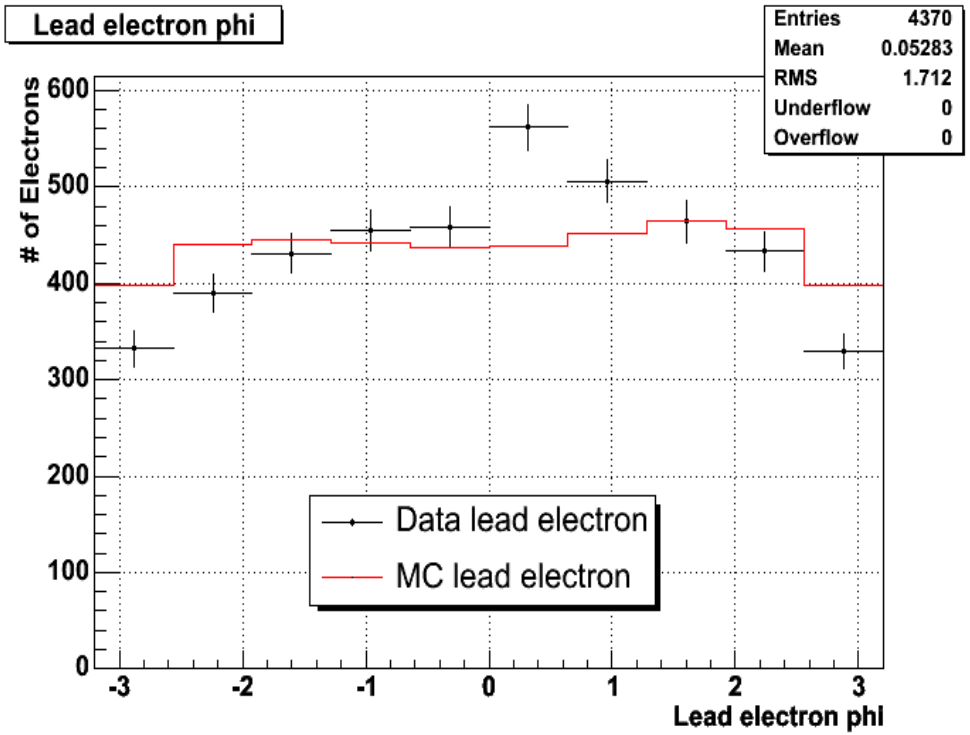


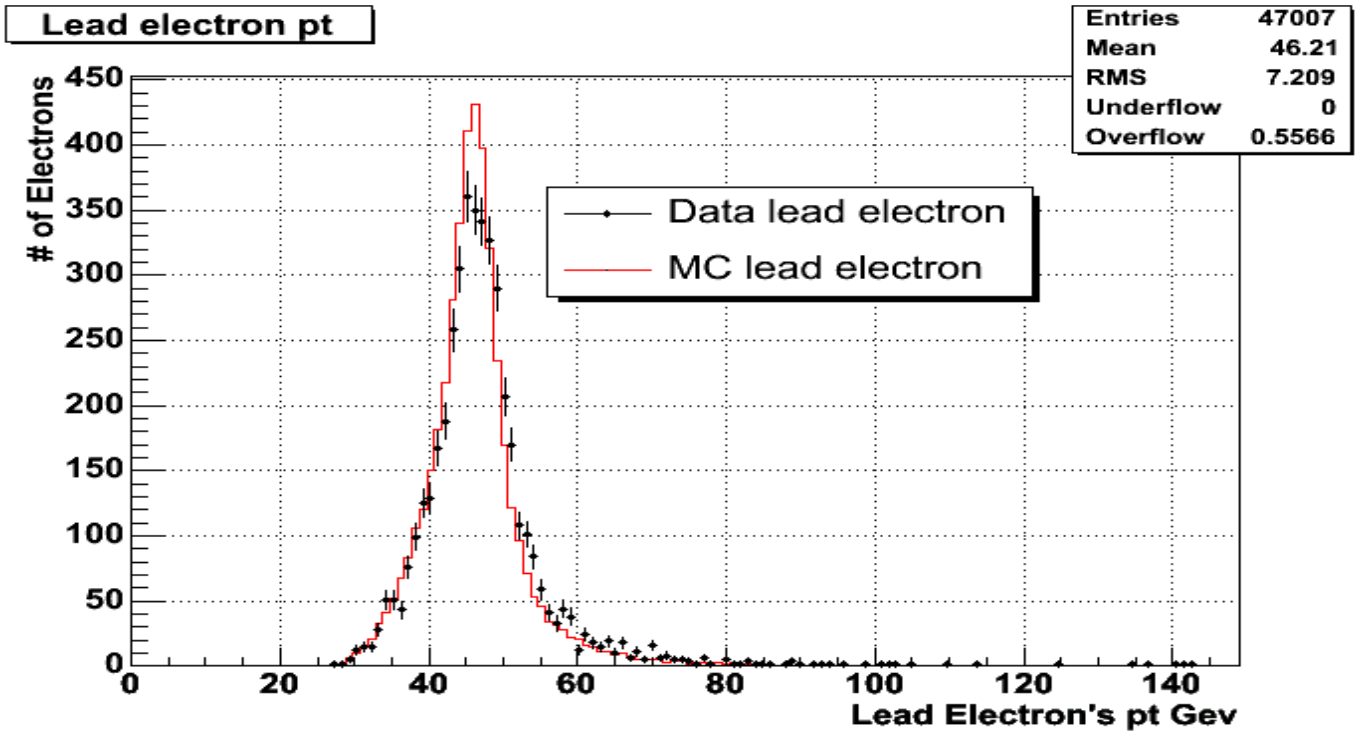




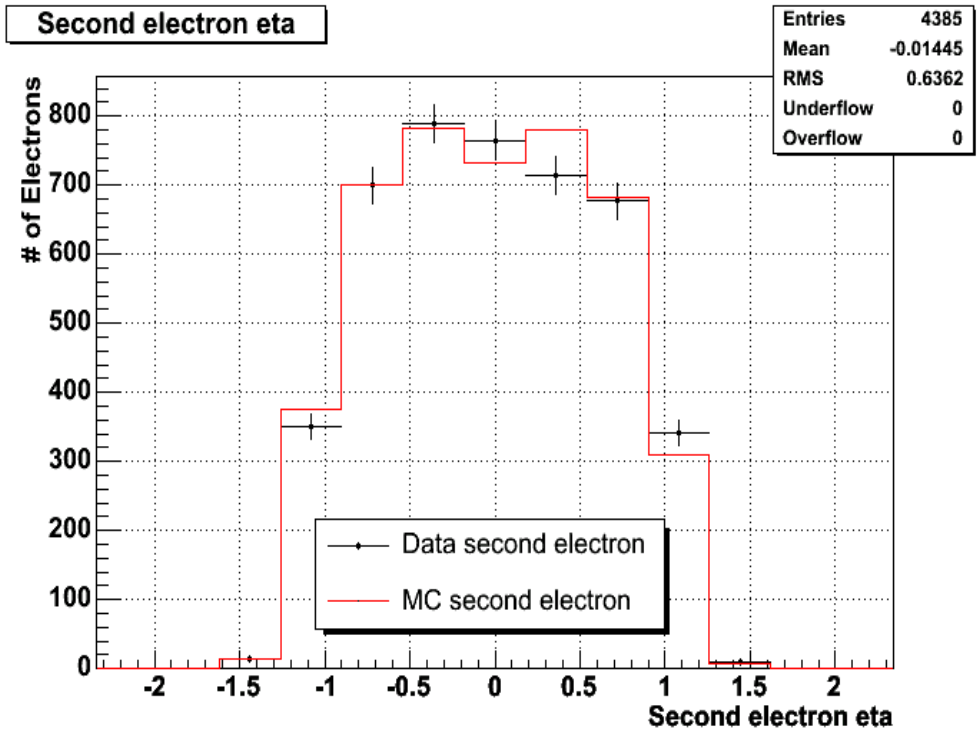
Lead electron distributions

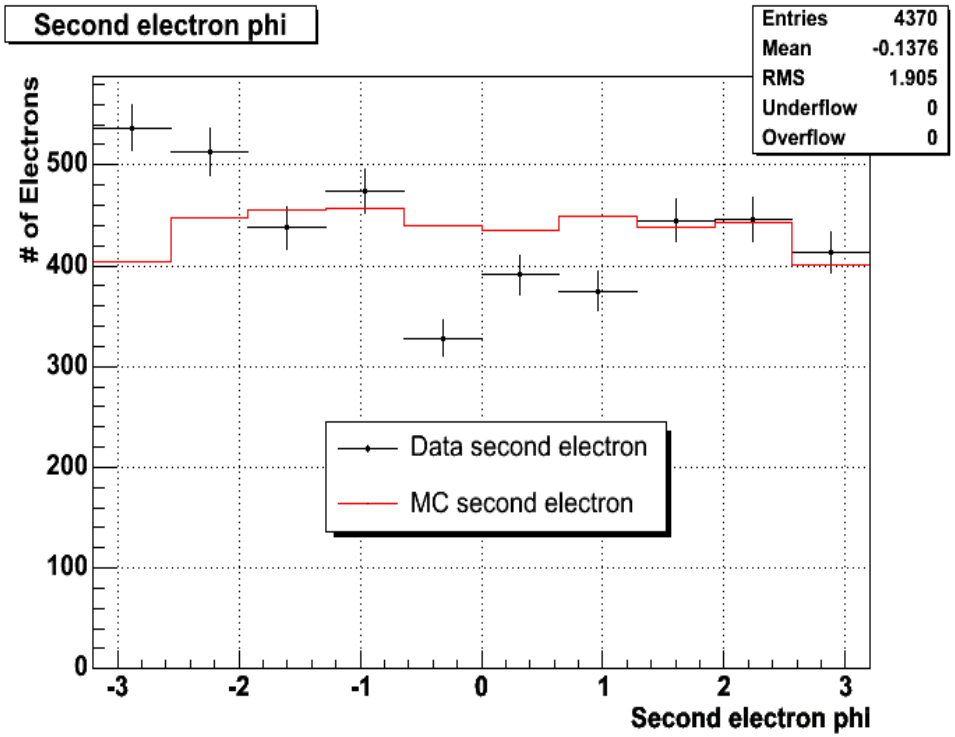


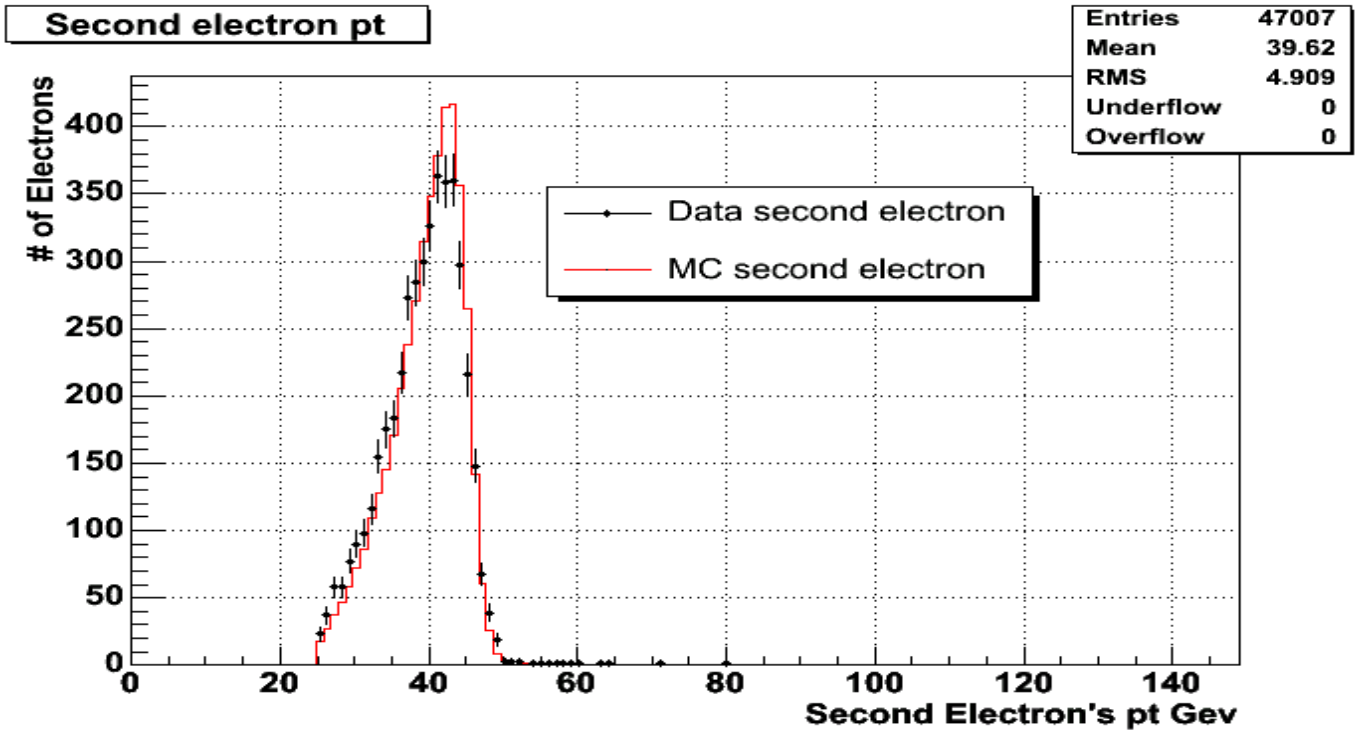




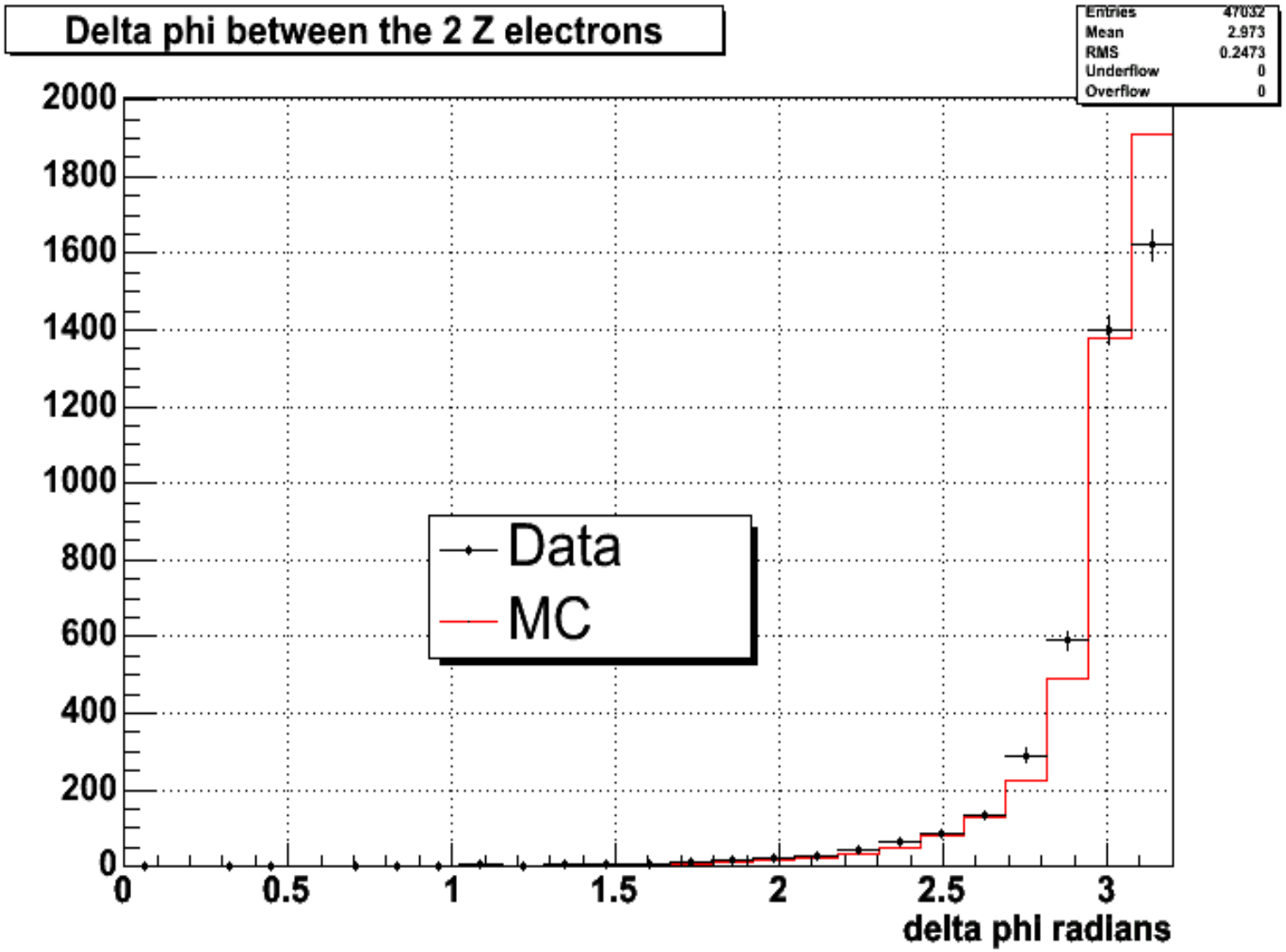
Second electron distributions







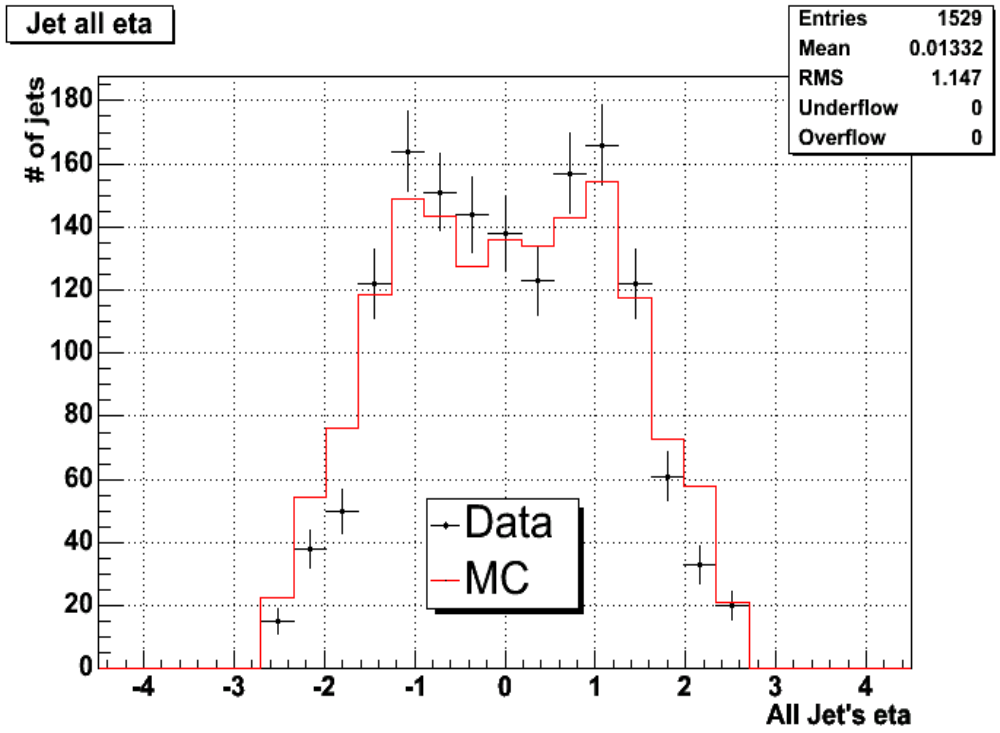
Delta Phi

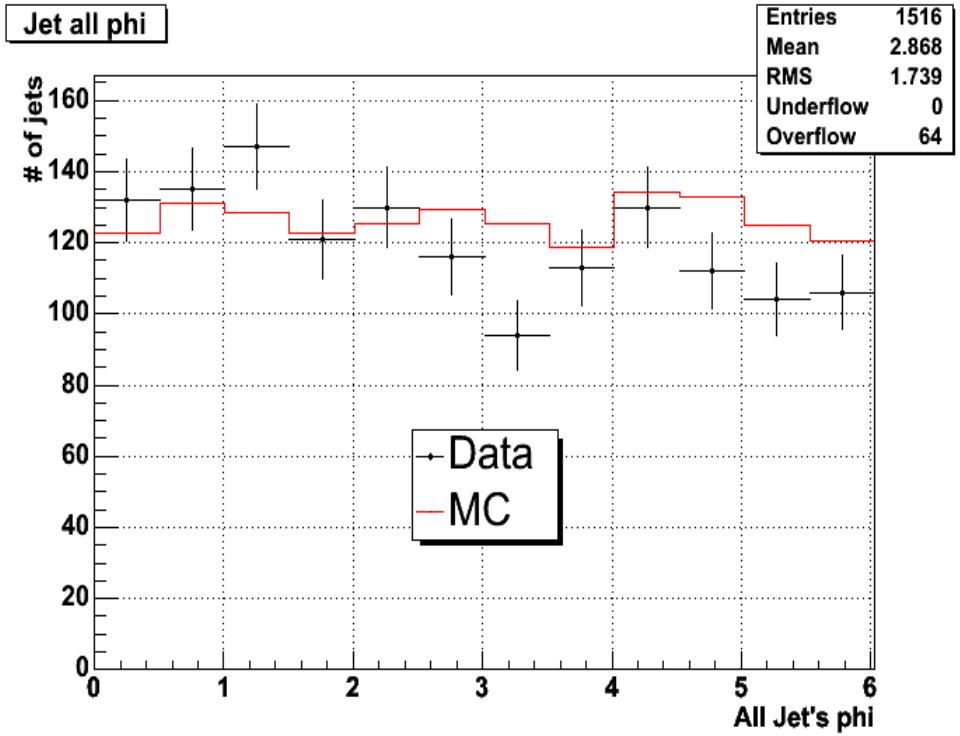

Delta phi between the 2 Z electrons
Entries 47032
Mean 2.973
RMS 0.2473
Underflow 0
Overflow 0
2000
1800
1600
1400
1200
1000
800
600
400
200
0
0
0.5
1
1.5
2
2.5
3
Data
MC
delta phi radians

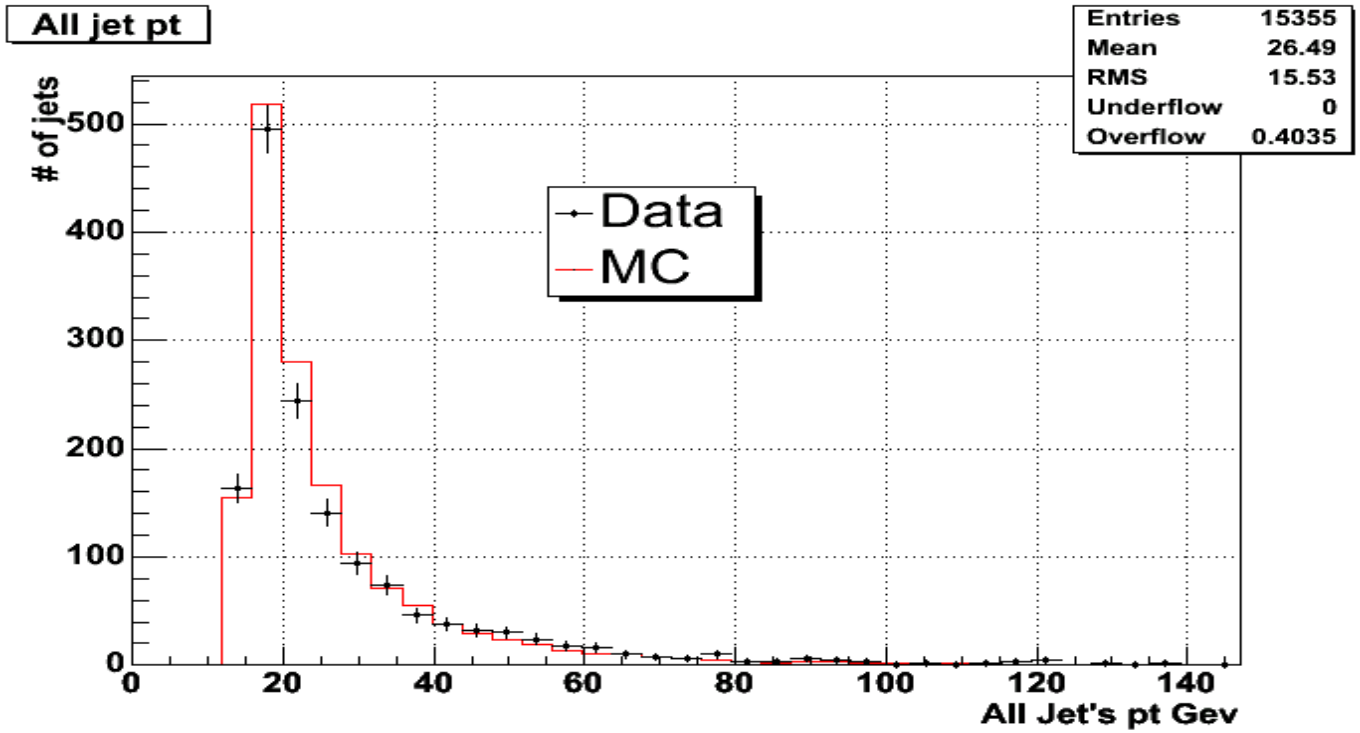
Jet distributions

Quality Cuts -from d0correct
Delta R matching to electrons decaying from Z is < 0.40
Jet pt > 15.0

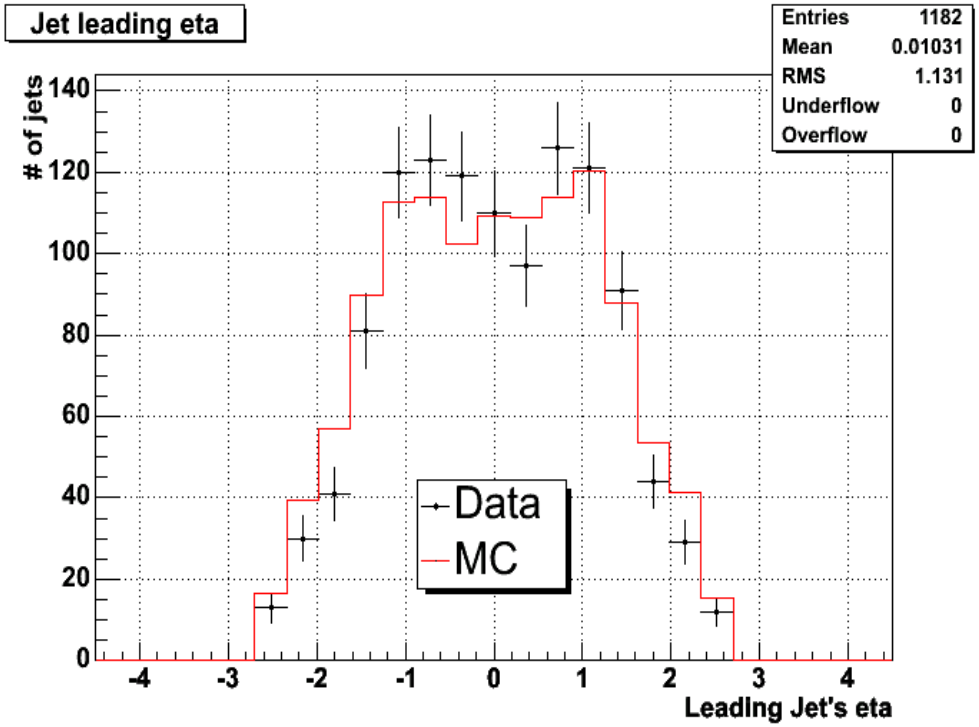
All jet distributions

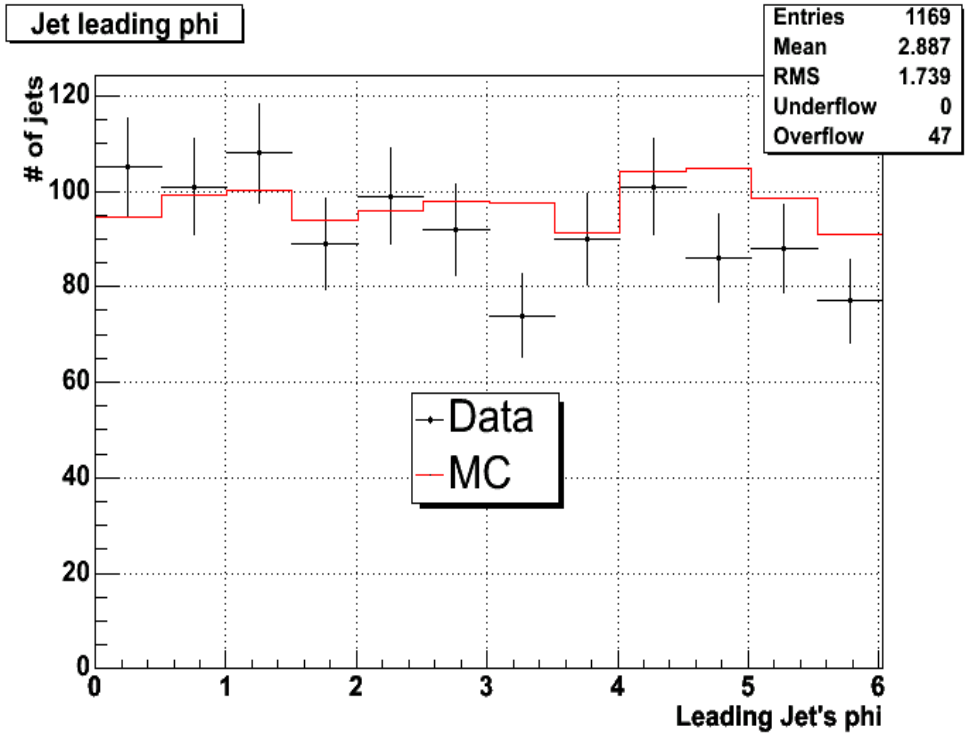


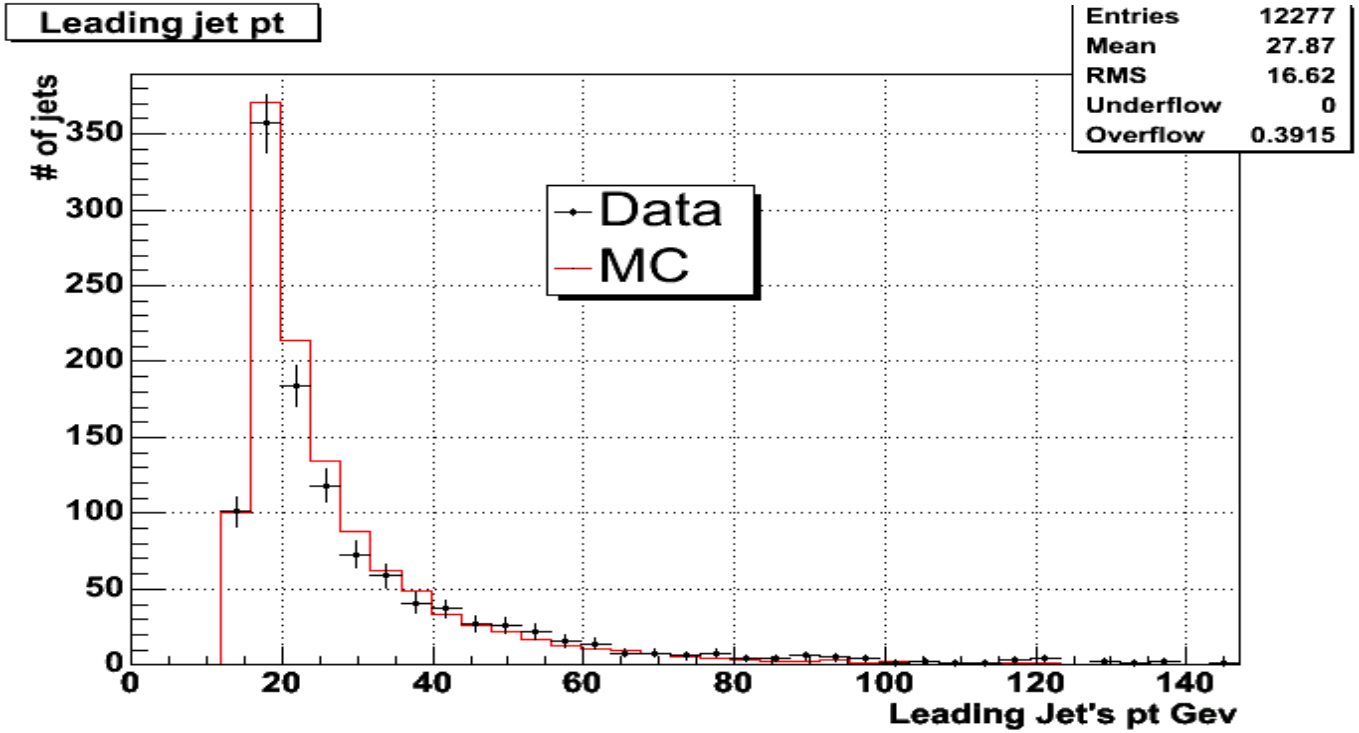




Leading jet distributions

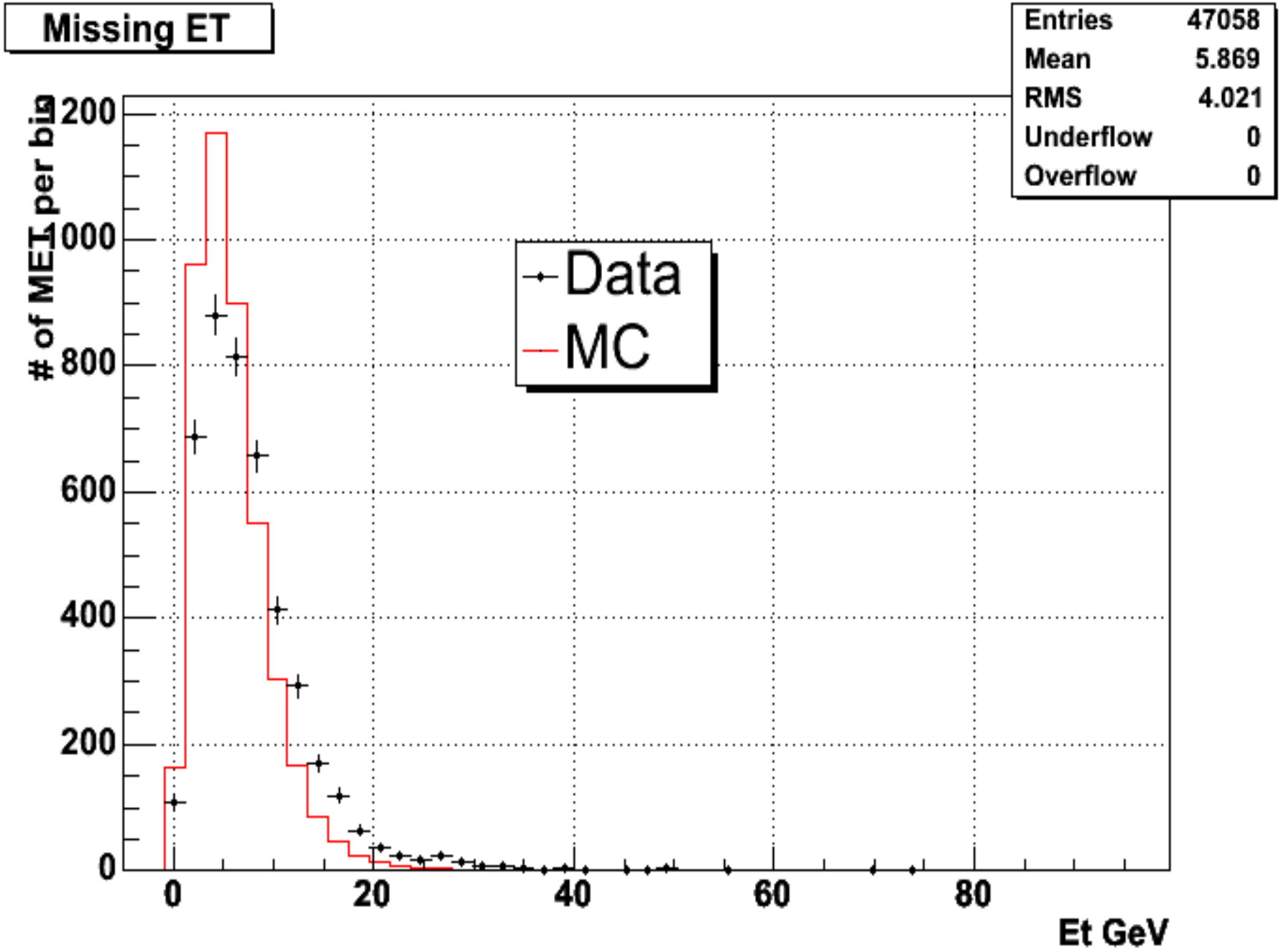




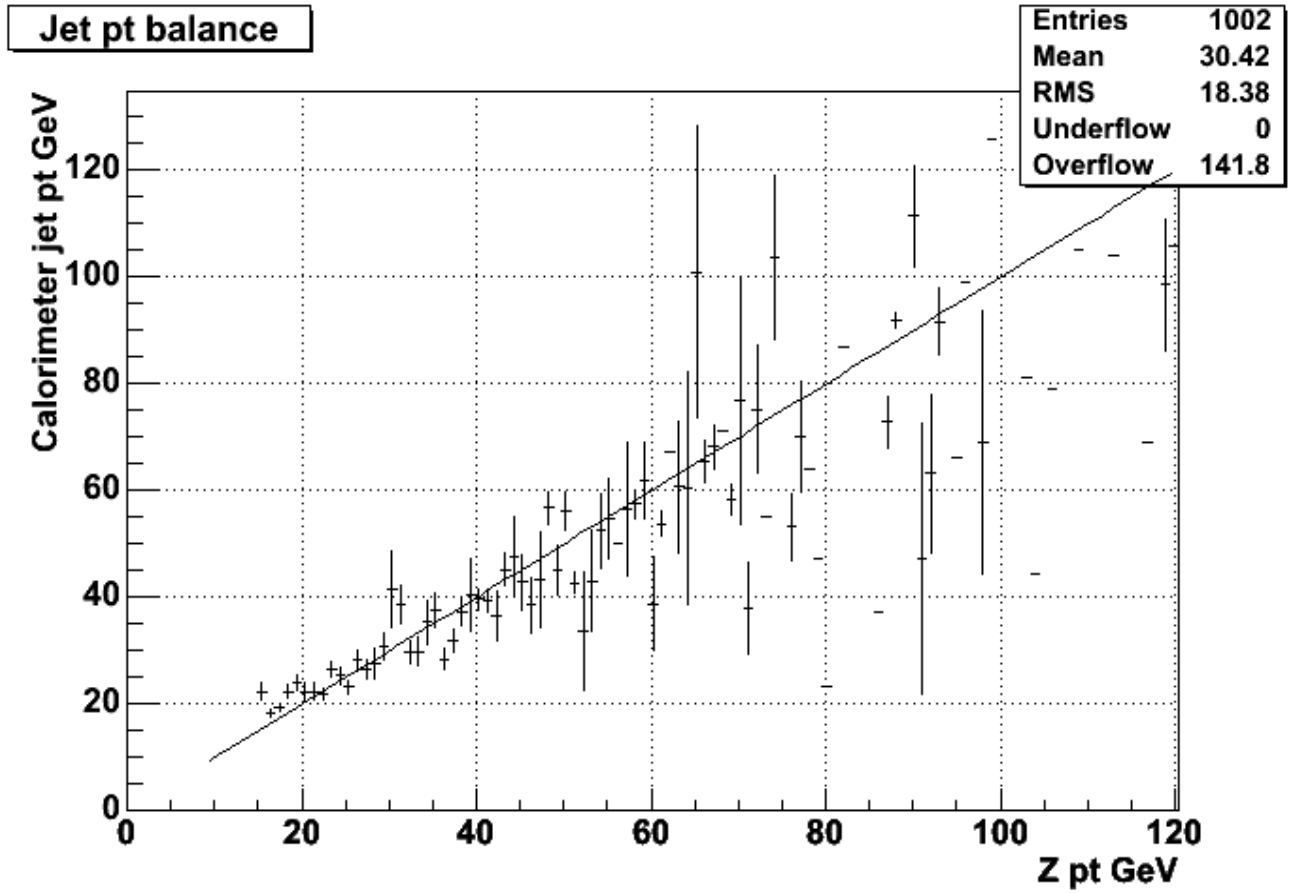


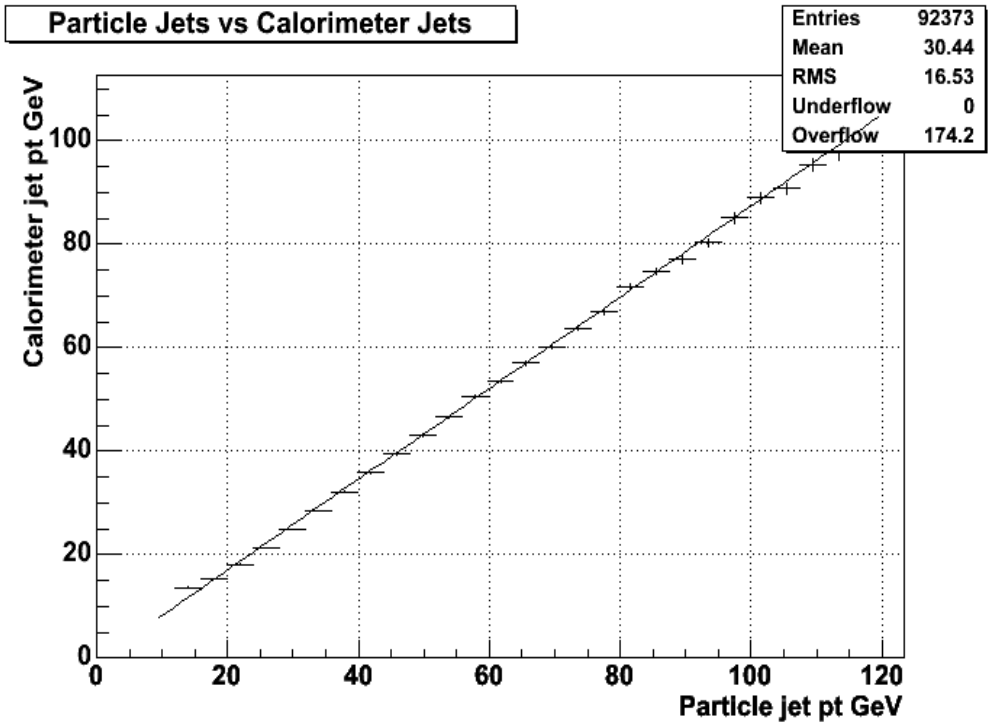
MET and Jet pt Balance

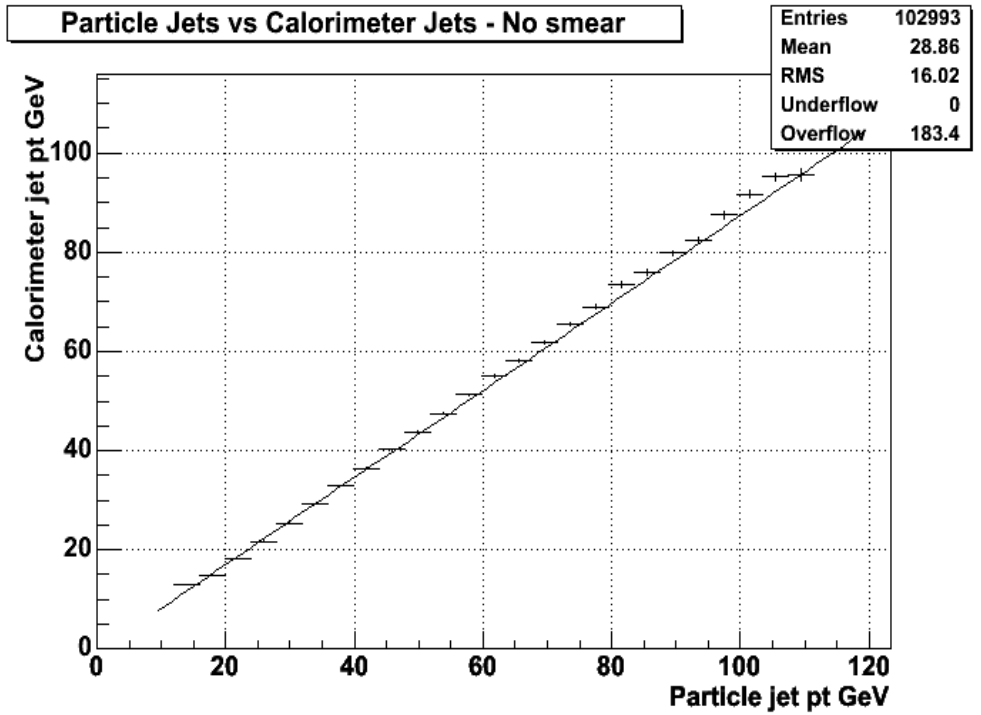
MET

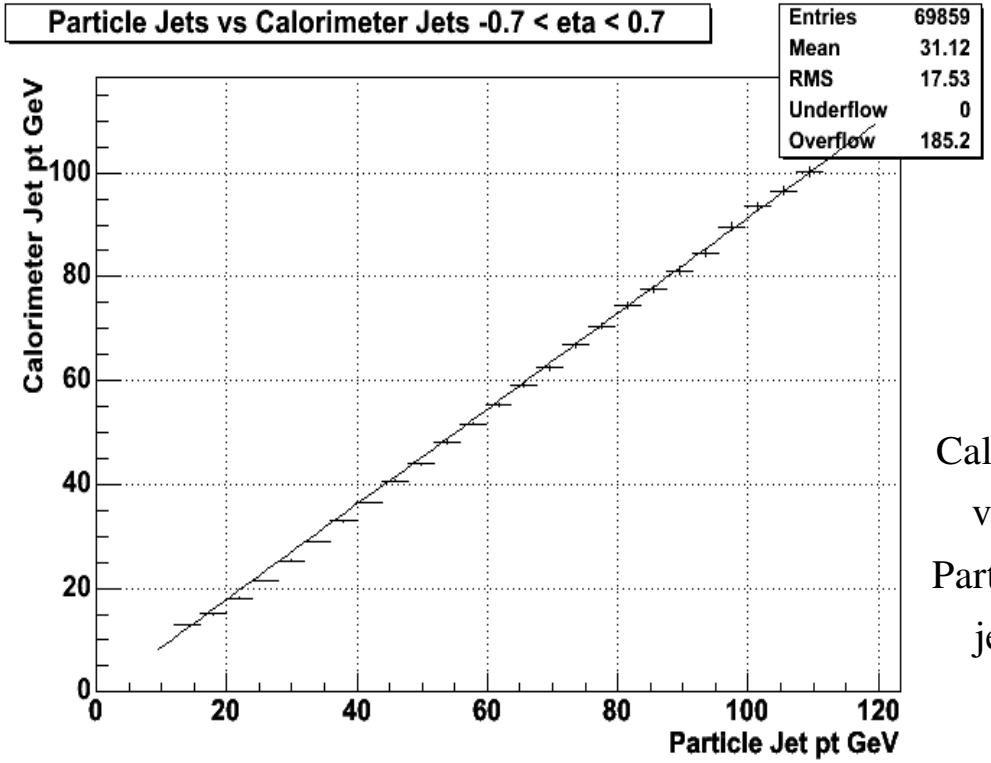

Missing ET
Entries 47058
Mean 5.869
RMS 4.021
Underflow 0
Overflow 0
Data
MC
# of MET per bin
200
1000
800
600
400
200
0
0
20
40
60
80
Et GeV

Calorimeter jet vs. Z pt

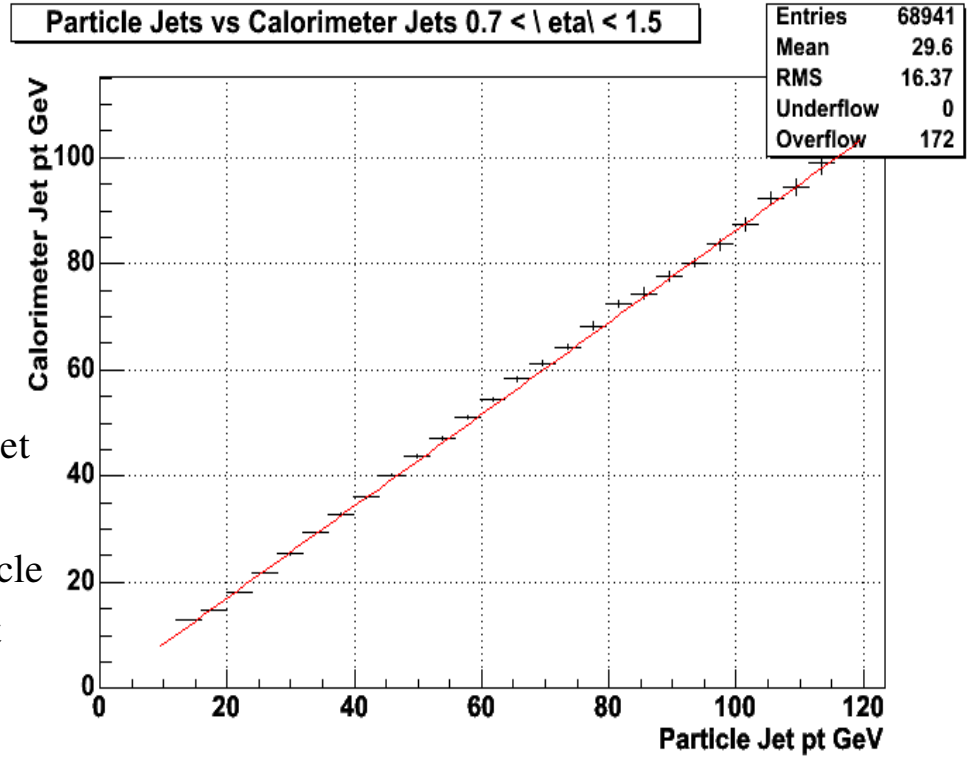


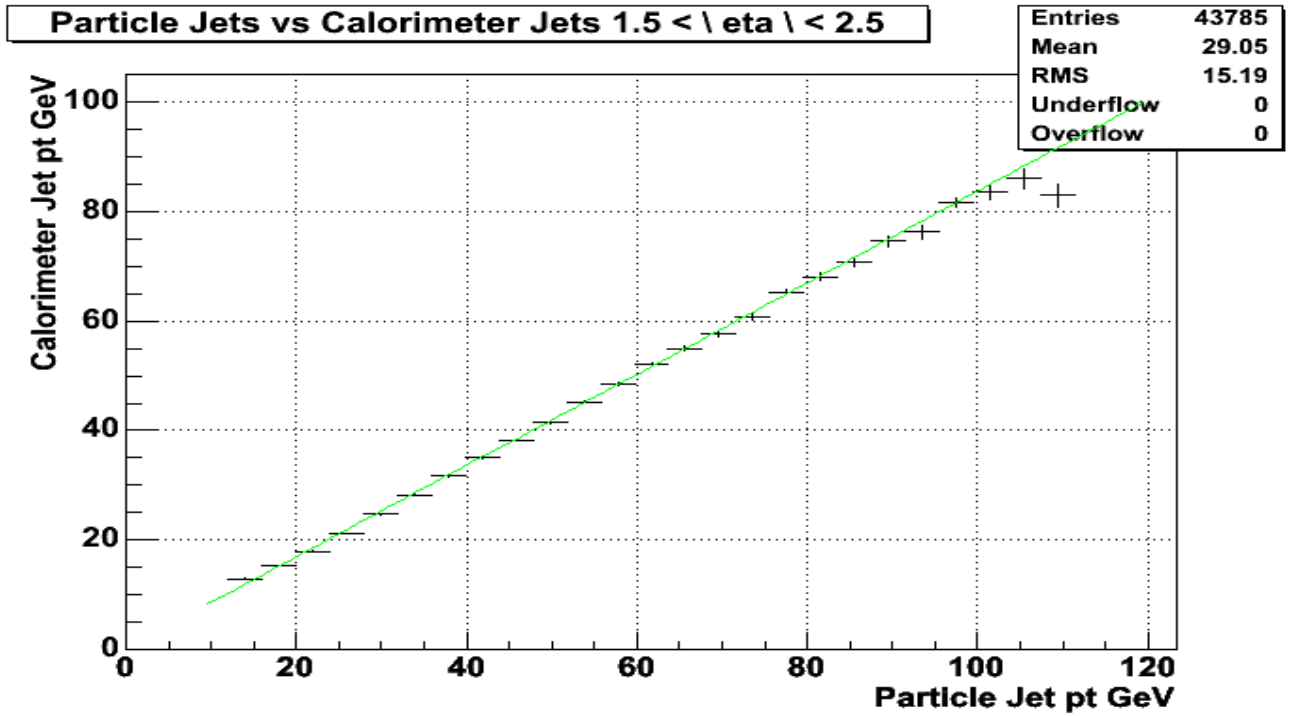


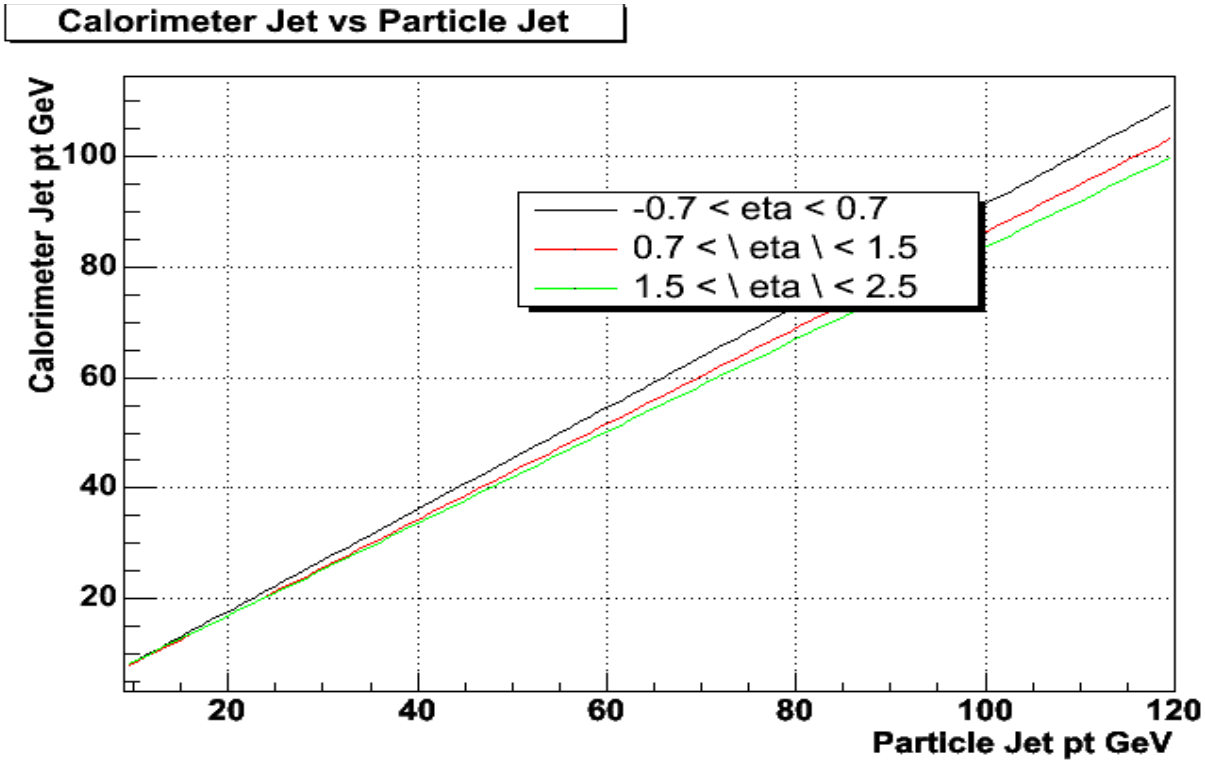




Cal jet vs Particle jet



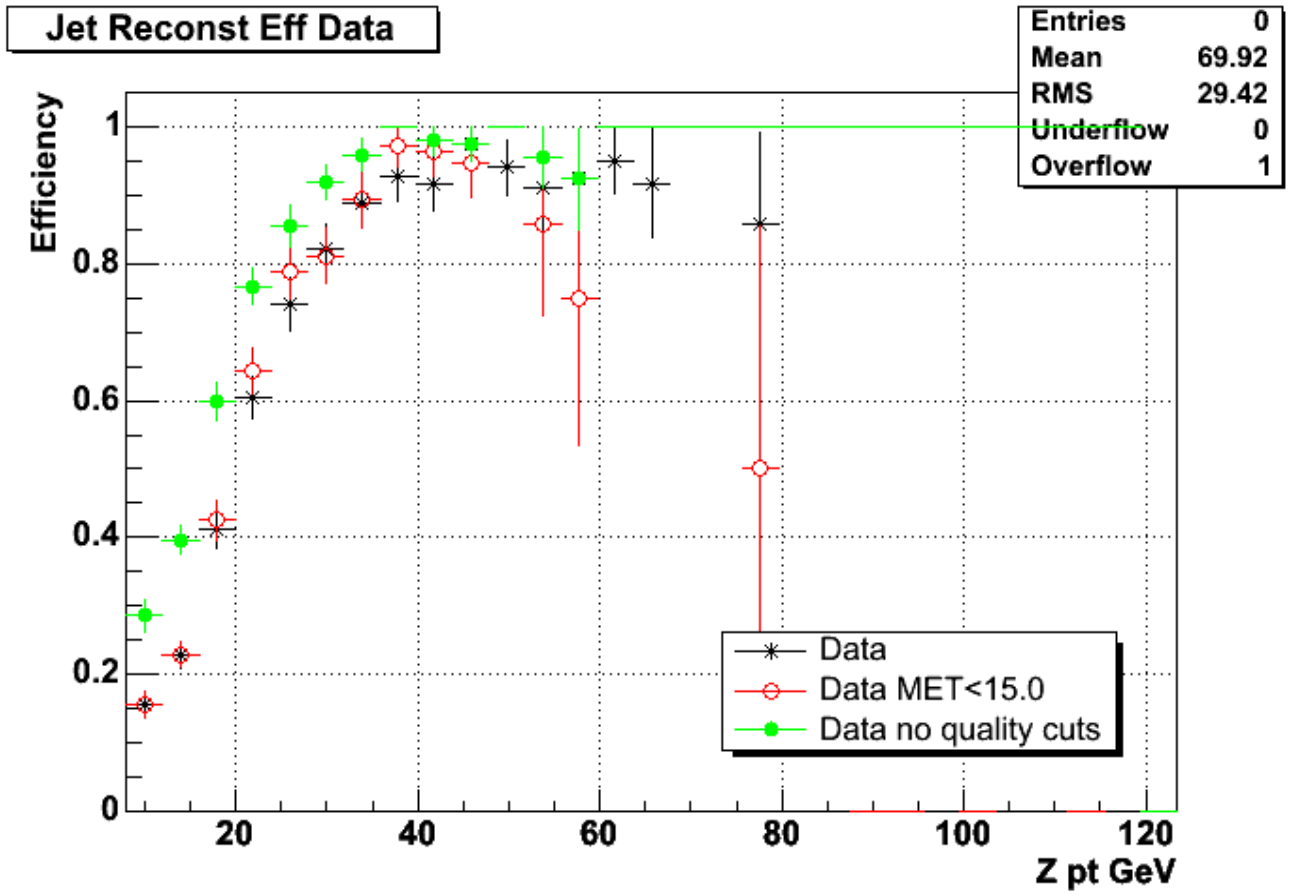




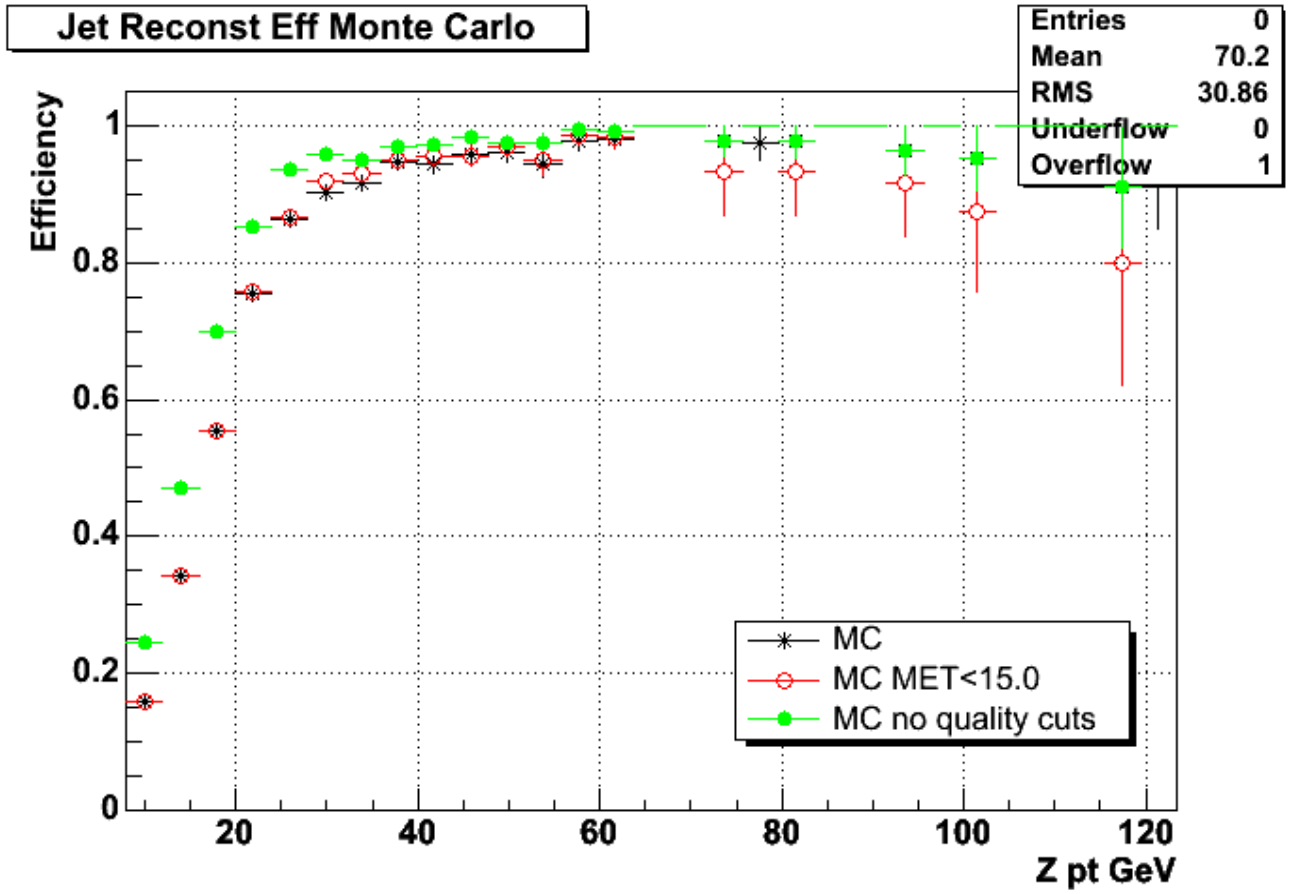
Cal jet
vs
particle jet

Z pt Efficiencies and Scale Factor

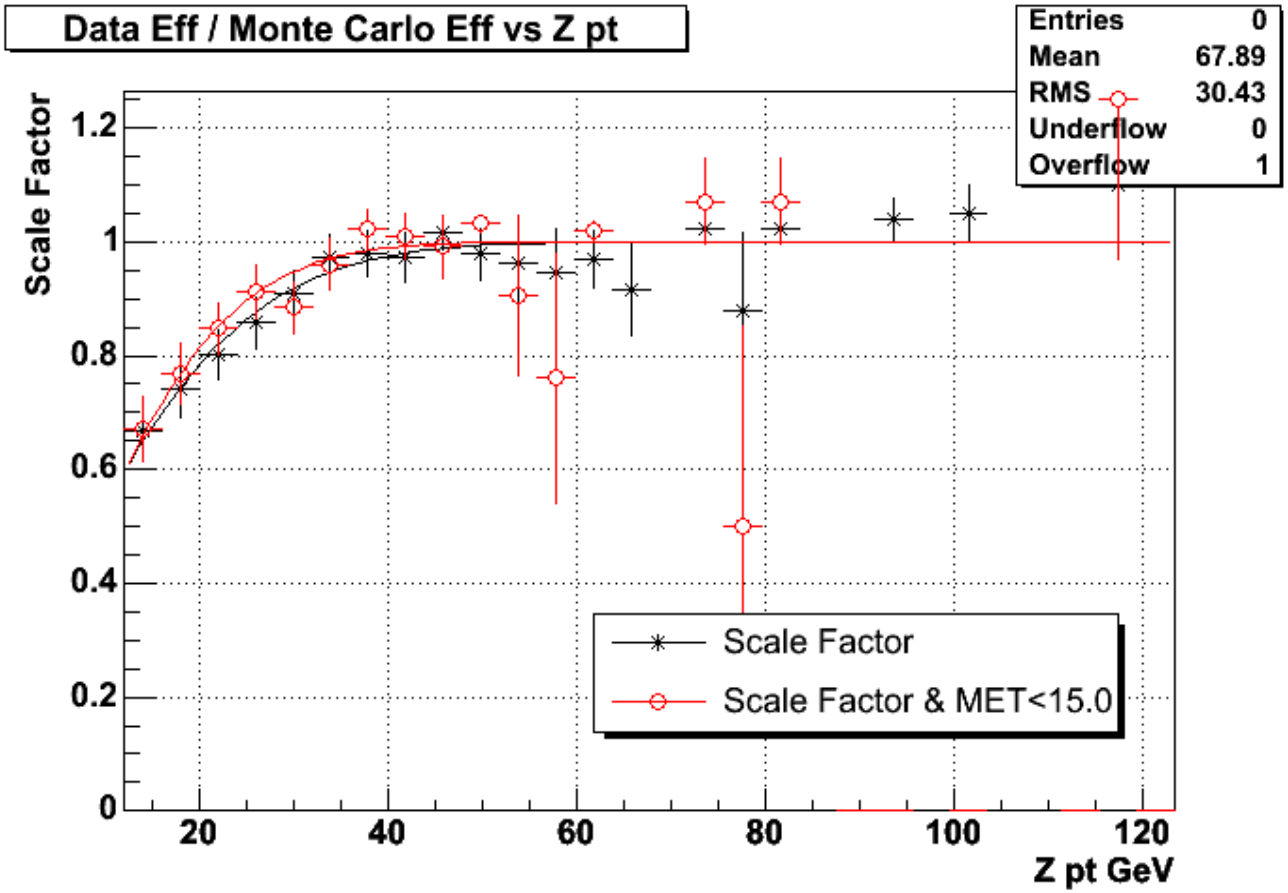
Jet Reco* ID Efficiencies via Z pt method



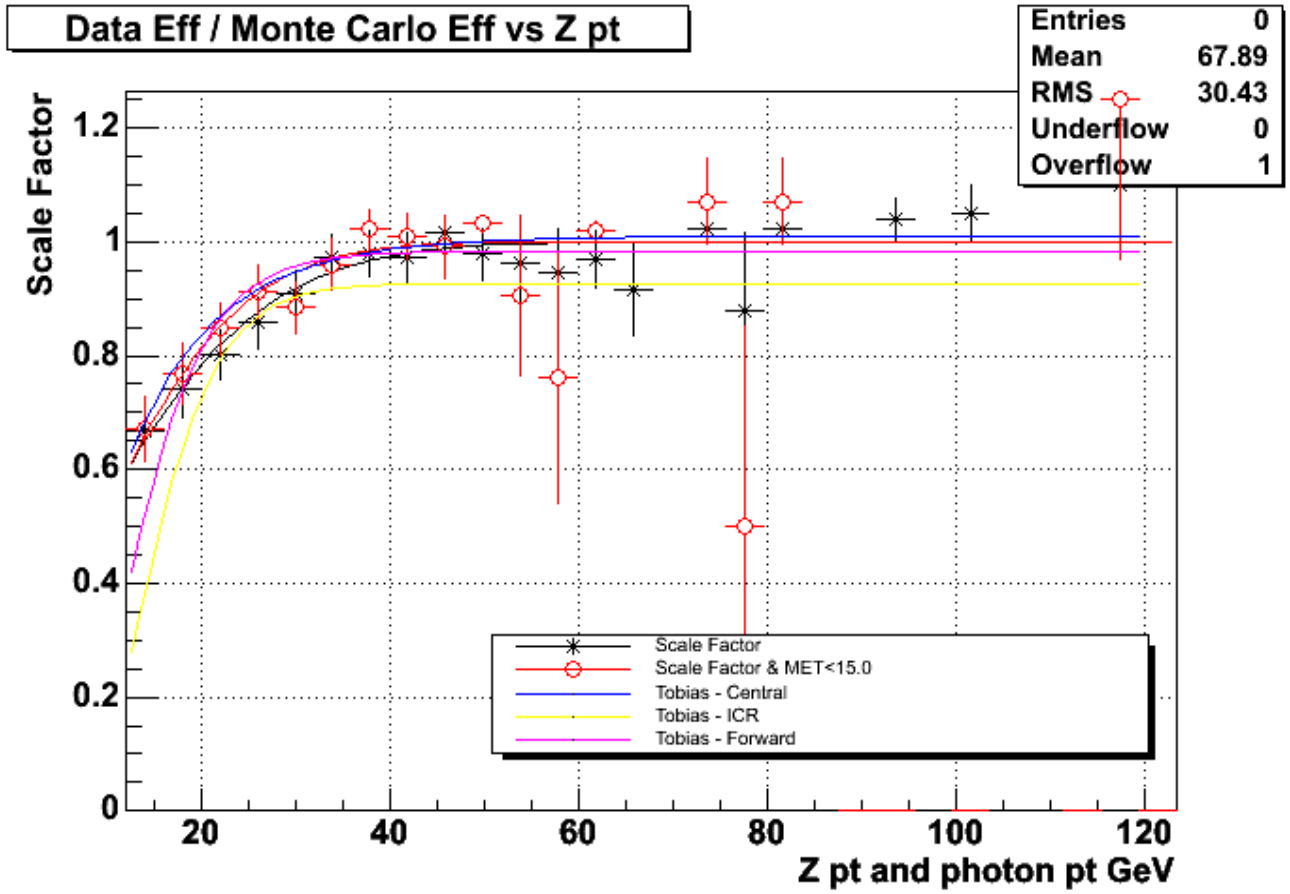
Monte Carlo Jet Reco*ID efficiencies
via Z pt method



Scale Factor



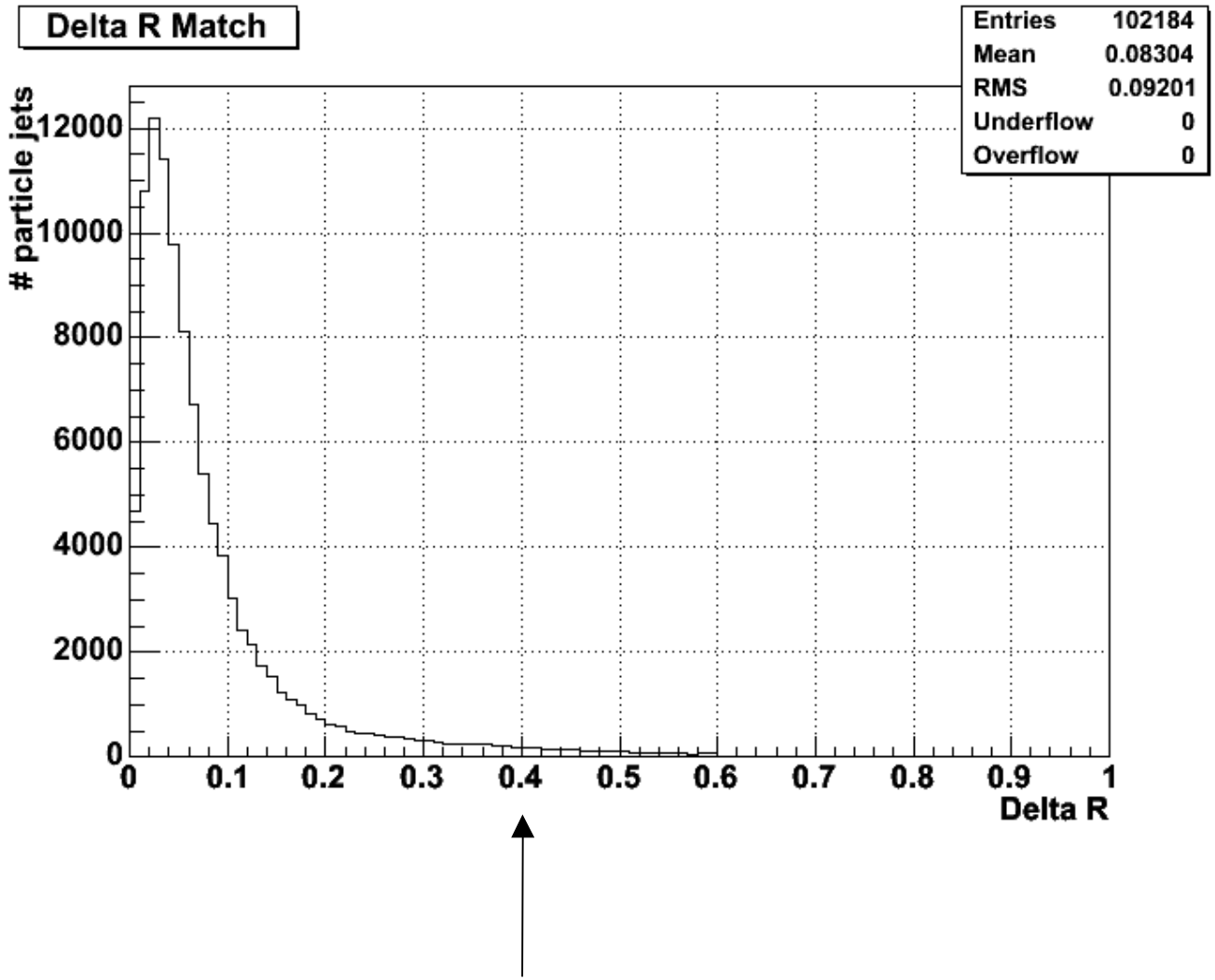
Different Scale Factors



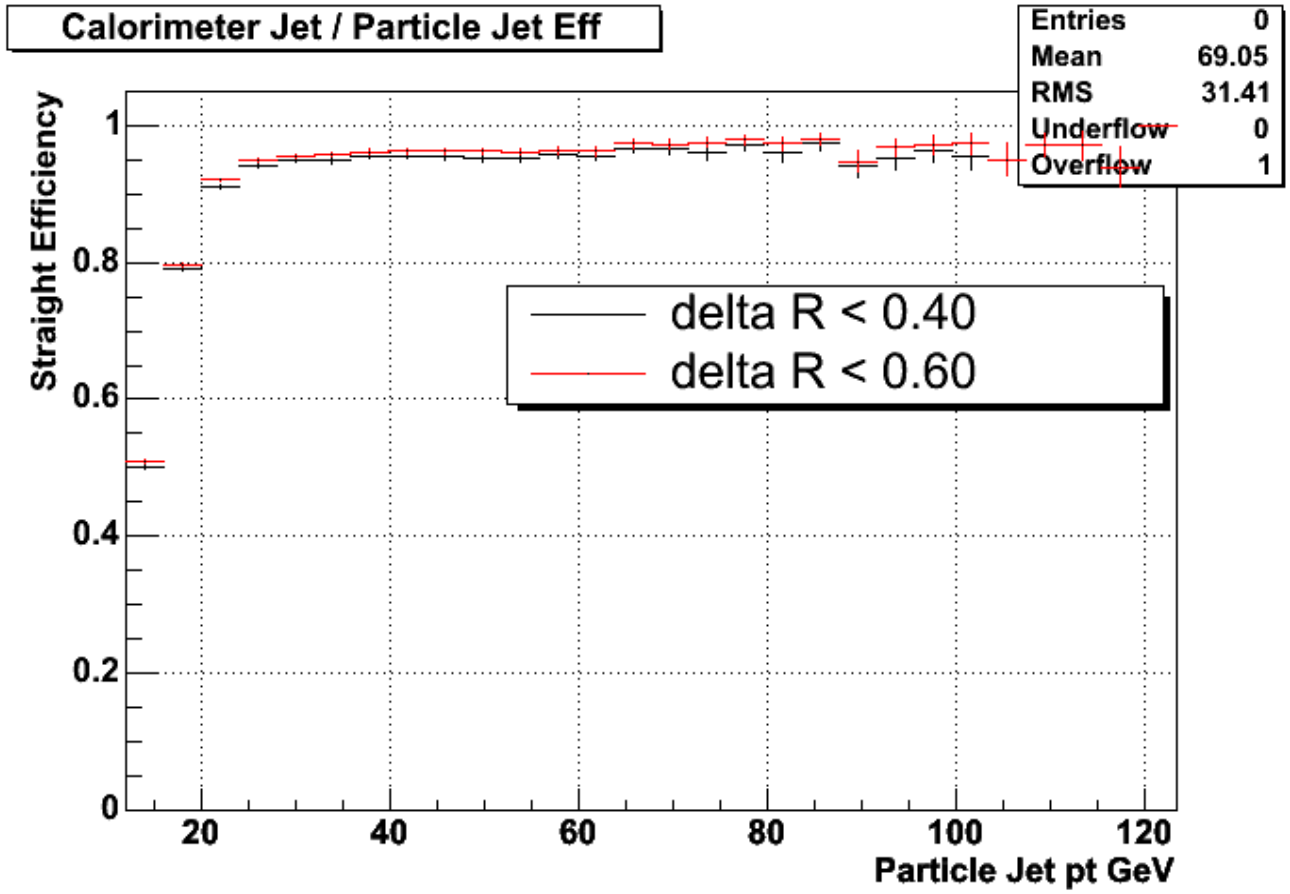
Straight Efficiencies

Paritcle Jet to Calorimeter Jet

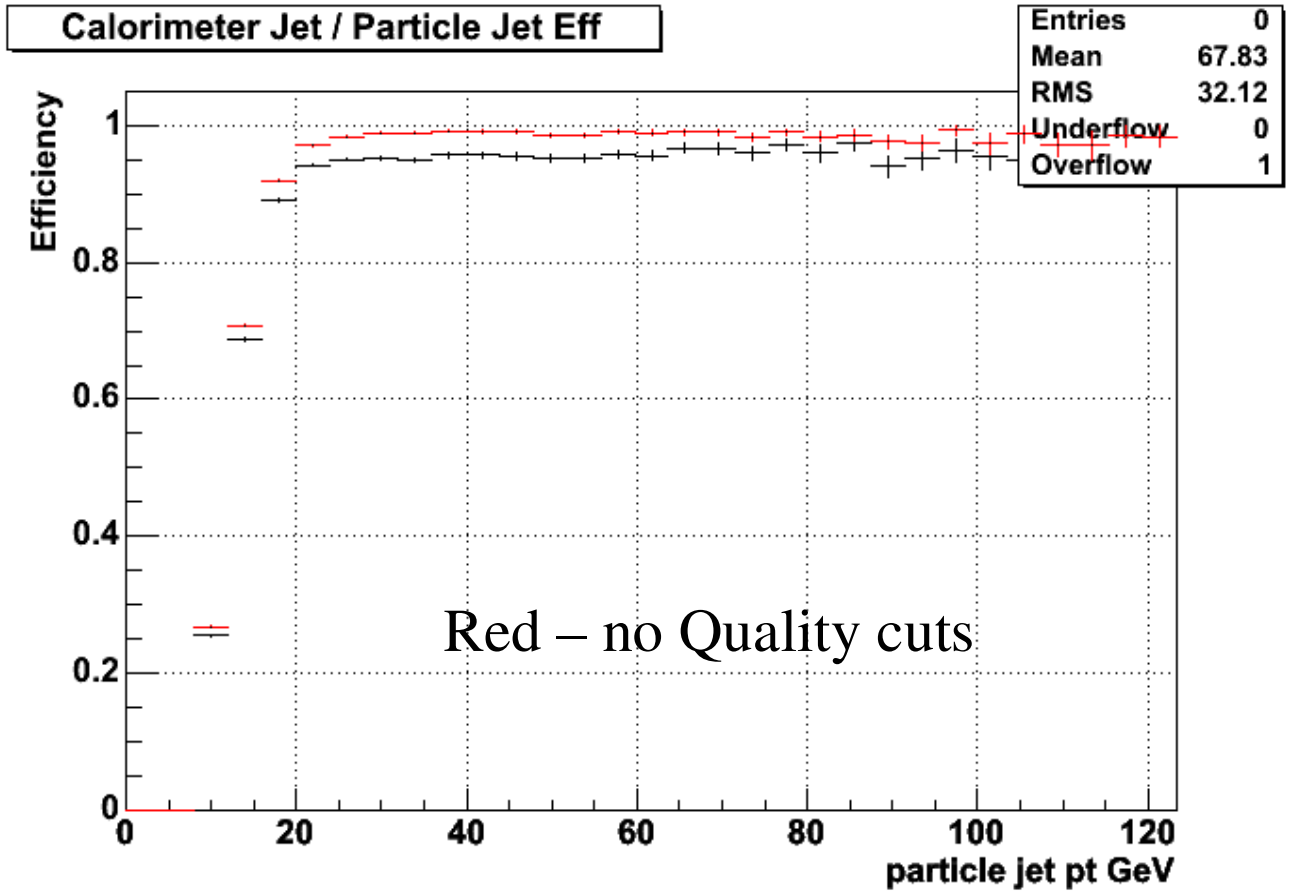
MC Straight Efficiency – Delta R between particle jet and calo jet



Monte Carlo Straight Eff – different delta R cuts



Monte Carlo


Calorimeter Jet / Particle Jet Eff
Entries 0
Mean 67.83
RMS 32.12
Underflow 0
Overflow 1
Efficiency
1
0.8
0.6
0.4
0.2
0
0
20
40
60
80
100
120
particle jet pt GeV
Red – no Quality cuts

Not included

Investigative work on the missing jets
Data – straight efficiencies – the rootuples are done
but I need to make the comparison plots
(All, central, icr, fwd)
Overlaying Z pt efficiency with data -straight efficiency